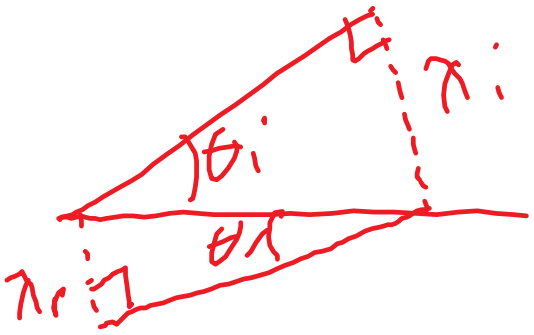


p854 Q39

$\lambda = 500nm$

1.00mm

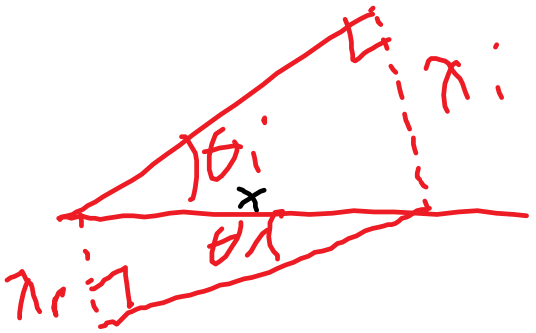
$1.50 = \frac{c}{v} = \frac{\lambda_v f}{\lambda_g f}$

$\lambda_g = \frac{\lambda_v}{1.5} = \frac{500nm}{1.5}$

$\frac{100mm}{500nm} = 2000$ wavelengths no pane

$\frac{1.00mm}{500nm/1.5} = 3000$ wavelengths

the phase change will be 1000 wavelengths
the waves will be in phase
(textbook says 1000 x 2pi radians)



$$\sin\theta = \frac{\lambda}{x} = \frac{v}{fx}$$

$$\frac{\sin\theta_i}{\sin\theta_r} = \frac{v_i / f x}{v_r / f x}$$

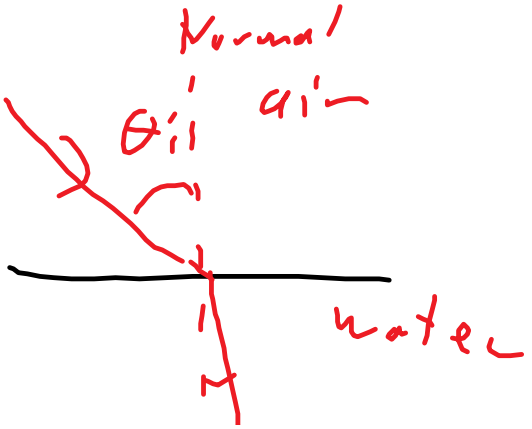
What is the relationship between the angle of incidence, θ_i, and the angle of refraction, θ_r, with the speed of the wave in each medium, v_i and v_r.

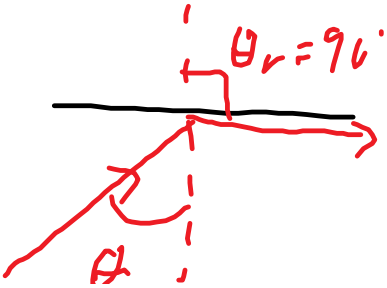
$$\boxed{\frac{\sin\theta_i}{\sin\theta_r} = \frac{v_i}{v_r}}$$

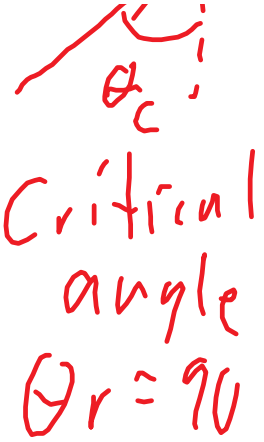
$$n = \frac{c}{v}$$

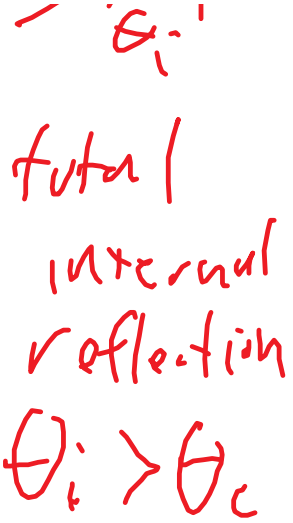
$$\frac{\sin\theta_i}{\sin\theta_r} = \frac{c/n_i}{c/n_r} = \frac{n_r}{n_i}$$

$$\boxed{n_i \sin\theta_i = n_r \sin\theta_r}$$ Snell's Law





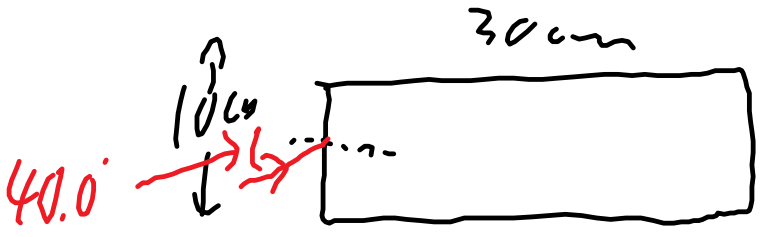




Lab next class:
shine light into water, n=1.33 and light from water into air, n=1.0003

1. if you shine light from air into water at 35.0º to the normal, what is the angle in the water?
2. What is the critical angle between water and air?

3. Light is incident on the following glass block, n=1.50, draw the light rays through the block.



p855 Q41, 43, 45, 49, 60, 65, 67

1. $n_i \sin\theta_i = n_r \sin\theta_r$

$n_i \sin\theta_i = n_r \sin\theta_r$

$1.00 \sin 35^\circ = 1.33 \sin\theta_r$

$\theta_r = \sin^{-1}\left(\frac{\sin 35}{1.33}\right)$

$= \boxed{25.5^\circ}$

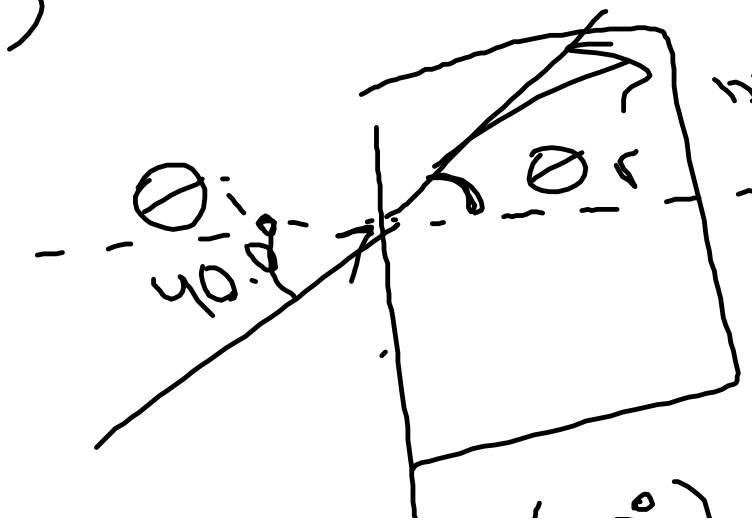
2. $\theta_i = \theta_c$ when $\theta_r = 90^\circ$

$n_i \sin\theta_c = n_r \sin 90^\circ$

$\theta_c = \sin^{-1}\left(\frac{n_r}{n_i}\right)$

$\theta_c = \sin^{-1}\left(\frac{1.00}{1.33}\right) = \boxed{48.8^\circ}$

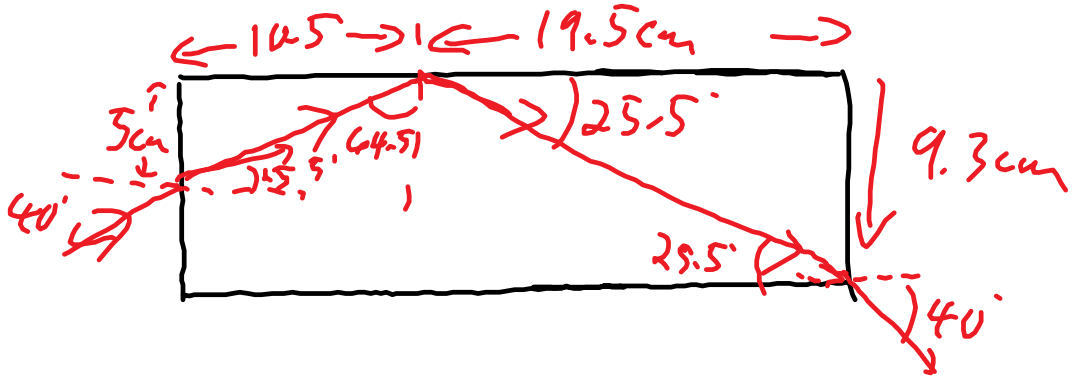
3



$n_i \sin\theta_i = n_r \sin\theta_r$

$1.00 \sin(90^\circ) = 1.50 \sin\theta_r$

$\theta_r = 25^\circ$



18.2 cm

$f = 440\,Hz$

$0.182 = \frac{\lambda}{4}$

$V = 320\,m/s$

57.2 cm

$f = 440\,Hz$

$39.0\,cm = \frac{\lambda}{2}$

$0.390 = \frac{V}{(440)}$

$V = 343.2\,m/s$

$\frac{3\lambda}{4} - \frac{\lambda}{4} = \frac{\lambda}{2}$